Republic of Mauritius

Sustainable Consumption & Production (SCP) Indicators

June 2010

Environment – Mauritius

Ministry of Environment and Sustainable Development

Sustainable Consumption & Production (SCP)

SCP Indicators

JUNE 2010

Note: The materials provided in this pocketbook have been drawn from statistics obtained from the Statistics Unit of the Department of Environment and most data cover the period 1990 to 2008. The indicators have been categorized according to 4 approaches, namely Efficiency, Critical Stock, Compliance and Connectivity as defined by UNEP Guidance Framework on SCP Indicators for developing countries.

This pocketbook on SCP indicators is free and has been produced by the Ministry of Environment and Sustainable Development with the support of UNEP. It is designed to be of interest to key stakeholders, tertiary students, research institutions, academia, NGOs, industry and business. An electronic version of this pocketbook can be downloaded from the Ministry's website: http://environment.gov.mu.

Readers are invited to make the distinction between official data which are published in the SCP Indicators and the analysis presented for the benefit of general readers. Differences of opinion may arise regarding the analytical part but these do not in any way, undermine the quality of the data. The Editors welcome any constructive critical comments via e-mail to: menv@mail.gov.mu.

Message of Hon.Devanand Virahsawmy, GOSK, FCCA

Minister of Environment and Sustainable Development

Hon.Devanand Virahsawmy, GOSK, FCCA
Minister of Environment and Sustainable Development

It is my pleasure and honour as Minister of Environment and Sustainable Development to present this first issue of the SCP Indicators. Sustainable Consumption and Production (SCP) is a main pillar of sustainable development. As a Small Island Developing State, we have no choice but to embark on the pathway of sustainable development.

The Government of Mauritius, under the enlightened leadership of the Prime Minister, Dr the Honourable Navinchandra Ramgoolam, is fully committed towards shaping the destiny of Maurice Ile Durable for decades to come and to make Mauritius a model of sustainability. I am convinced that, together, we will be successful in this endeavour.

Our pursuit for a “green and sustainable Mauritius” compels us to ensure the decoupling of environmental impact from economic growth. Sustainable consumption and production (SCP) should not be viewed as an obstacle but rather as a challenge to be faced and an opportunity to be seized to reorient our patterns of consumption and production towards sustainability.

This pocketbook presents a set of 30 indicators on sustainable consumption and production. Its objectives are to guide our understanding of the consumption and production patterns in Mauritius in order to trigger appropriate policy responses and set the appropriate norms. The indicators cover a wide range of SCP topics

and graphical illustrations facilitate accessible and quick reference. The pocketbook will particularly be useful to policy makers, decision makers, students, academia and to the public in general.

The data series clearly indicate the trends of the pattern of consumption and production. Many of the indicators are decoupling indicators which specifically measure trends in breaking the link between economic growth and environmental degradation e.g. energy intensity which shows the energy consumption per unit of GDP.

It is my sincere hope that this in-depth analysis of our consumption and production patterns will stimulate innovative thinking and provide all stakeholders with meaningful information to guide decisions whilst addressing current and emerging environmental complexities.

Finally, I would like to congratulate the editorial team and all those who have contributed in the preparation of this pocketbook. My special thanks go to the United Nations Environment Programme (UNEP) for its valuable support in the realization of this publication. I am sure that the implementation of the identified projects under the National Programme on SCP for Mauritius including the ecolabelling, sustainable products, sustainable buildings, energy auditing, rainwater harvesting and sustainable public procurement, amongst others will allow for the development of more meaningful indicators in our future publications of SCP Indicators. There is no doubt that in future years, the benefits of SCP will be better supported by more pertinent indicators, hence it will be more tangible and visible.

Hon. Devanand Virahsawmy, GOSK, FCCA
Minister of Environment and Sustainable Development

Contents

Abbreviations and Symbols

%	Percentage
CO_2	Carbon Dioxide
GDP	Gross Domestic Product
GHG	Greenhouse gases
Gg	Gigagram (thousand tonnes)
GWP	Global Warming Potential
km	Kilometres
km^2	Square kilometres
ktoe	Thousand tonne of oil equivalent
Mm^3	Million cubic metres
No.	Number
PET	Polyethylene Terephthalate
Rs	Rupees
Rs mn	Rupees million
000	Thousand
Toe	Tonne of oil equivalent

Introduction

Sustainable Consumption and Production (SCP) forms a critical means for achieving sustainable development. Decoupling economic growth from environmental impact requires producers to change design, production and marketing activities, while consumers need to provide for environmental and social concerns – in addition to price, convenience and quality – in their consumption decisions. Policy-makers have therefore a crucial role to play in stimulating the recognized need for "fundamental changes in the way societies produce and consume".

Indicator – based monitoring is one of the most effective tools to measure progress towards more sustainable consumption and production patterns. Since quantitative indicators can help to gauge whether we are moving closer to, or farther away from, sustainable consumption and production patterns, they assist decision makers for tracking progress on set priorities and targets.

What are SCP indicators?

Indicators are aggregates of raw and processed data, derived from a series of observed facts that can describe the state of a phenomenon and/or reveal relative changes as a function of time. They help to quantify and simplify phenomena, understand complex realities and analyze change in society.

Decoupling Indicators?

Decoupling indicators usually show how an environmental pressure variable is changing relative to an economic driver variable (e.g. change in GDP). They specifically measure trends in breaking the link between economic growth and environmental degradation.

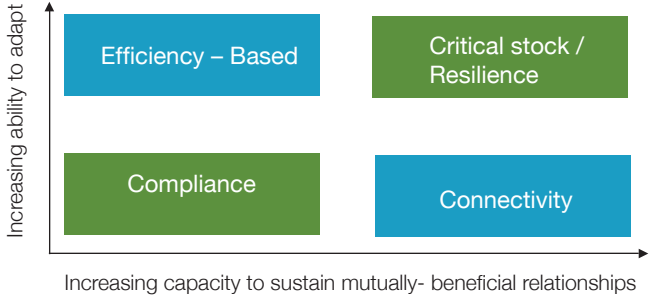
Benefits of SCP-related indicators

Properly developed and implemented, indicators can make a critical contribution towards decision policy development. The benefits of effective SCP-related indicators include:-

- *facilitating the monitoring and review of progress in achieving key objectives and targets;*
- *allowing effective reporting to decision-makers and the public, thus encouraging accountability;*
- *clarifying the meaning and application in practice of sustainable production and consumption;*
- *contributing to the revision of existing strategies and action plans, and the development of new plans;*
- *raising the political and public profile of SCP-related issues;*
- *encouraging meaningful dialogue on sustainable consumption and production.*

The SCP Indicator COMPASS

Depicted in simple graphical form, the SCP Indicator Compass indicates the direction towards a more sustainable society.



As per UNEP Guidance Framework on SCP Indicators for developing countries, four perspectives emerge that delineate present approaches to informing the development of SCP indicators:-

Efficiency – Based

Indicators that reflect on material, energy and water intensity of products and processes e.g. energy consumption per capita, domestic water consumption per capita, consumption of fertilizers and pesticides.

Critical Stock

Indicators that reflect on the degree to which production and consumption systems are transforming to take account of the need to restore (or at least not systematically degrade) critical stocks of natural capital, e.g. Percentage of renewable sources per total supply of primary energy, water balance.

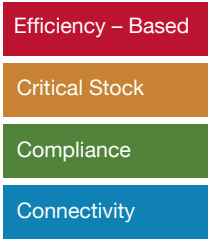
Compliance

Indicators that reflect on compliance with national and international legislation relating to sustainable development, e.g. number of environmental complaints, number of contraventions and notices issued to drivers of vehicles emitting black smoke.

Connectivity

Indicators that reflect on individual, organizational and national access to information, knowledge, transportation, communications and other social networks, e.g. literacy rate, human development index, number of internet subscribers.

Set of SCP Indicators



Set of SCP Indicators

Efficiency – Based

- Energy Intensity
- Energy Consumption per capita
- Greenhouse gas emissions per capita
- Greenhouse gas emissions per GDP
- Carbon dioxide emissions from fossil fuels by sector
- Water Utilization by sector
- Domestic Water Consumption per capita
- Waste sent to landfills per GDP
- Collected domestic waste per capita
- Domestic Material Consumption per capita
- Consumption of fertilizers and pesticides
- Number of vehicles per km of road
- Private cars per 1000 inhabitants

Critical Stock

- Economic growth
- Water Balance
- Percentage of renewable sources per total supply of primary energy
- Land Use by category
- Annual fish Catch of the coastal (artisanal) fishery
- Respiratory diseases
- Waterborne diseases
- Population growth rate

Compliance

- Number of environmental complaints
- Penalties
- Number of offences against forest laws

Connectivity

- Human Development Index
- Gini Coefficient
- Adult Literacy Rate
- Total Length of Road
- Number of Internet Subscribers
- Total Public Transportation Journeys

Overall messages from indicators

It can sometimes be difficult to look at a graph and immediately understand the messages. It is therefore useful to be able to summarize what the indicator measures tell us. To highlight whether the trends of the consumption and production patterns are sustainable or not, a set of traffic lights has been used:-

- √ Improvement towards Sustainable pattern of Consumption and Production
- ≈ Little or no change or stabilization
- × Deterioration, Unsustainable pattern of Consumption and Production
- ••• Contextual or insufficient and no comparable data

For each indicator, the change since 2 base years, namely 1990 (or the closest year available) and 2000 has been assessed. 2 traffic light assessments of overall progress have been determined by comparing the measure in the latest year with its position at the two base years or another base year as available.

Between the base year and current position, the measure may have deteriorated and then improved, or vice versa. However, the traffic lights only reflect the overall change in the measure from the base year to the latest position and do not reflect fluctuations during the intervening years.

For most indicators, it is very clear whether there has been an improvement or deterioration, in which case either √ or × have been used respectively as traffic signals.

However, for some indicators, the amount of change over time is small and it is difficult to judge whether they are sufficient to indicate whether there has been a clear improvement or deterioration. Furthermore, for some indicators such as CO_2 emissions per capita, stabilization was observed in the past years. In those cases, where little or no change or stabilization was observed, the traffic signal ≈ has been used.

Another traffic light assessment has been done to show the direction of change in the latest year, which for most cases is year 2008. The direction of change provides an indication whether the trend is towards improvement or deterioration and is crucial to determine the future policy responses to orient the patterns of consumption and production towards sustainability.

The figure below provides a summary of the SCP indicators with their traffic light assessment.

Indicator	Overall Change since 1990 [1]	Overall Change since 2000 [1]	Direction in latest year [2]
1. Energy Intensity	√	√	√
2. Energy Consumption per Capita	✕	✕	√
3. Greenhouse Gas Emissions per capita	✕	✕	✕
4. Greenhouse Gas Emissions per GDP	√	√	√
5. Carbon Dioxide Emissions from fossil fuels by sector	✕ [1]1995	✕	≈
6. Water Utilization by Sector	≈ [1]2000	≈	≈
7. Domestic Water Consumption per Capita	✕	✕	√
8. Waste sent to landfills per GDP	√ [1]2001	√ [1]2001	√
9. Collected Domestic Waste per Capita	✕ [1]1999	✕	√
10. Domestic Material Consumption per Capita	√ [1]2005	√ [1]2005	√
11. Consumption of fertilizers and pesticides	√ [1]1995	√	√
12. Number of vehicles per km of road	✕	✕	✕
13. Private cars per 1000 inhabitants	✕	✕	✕
14. Economic Growth	...	...	...
15. Water Balance	... [1]1998	...	...
16. Percentage of renewable sources per total supply of primary energy	✕	✕	√
17. Land Use by Category	... [1]1995	...	...
18. Annual Fish Catch of the coastal (artisanal)fishery	... [1]1993	...	...
19. Respiratory diseases	✕	✕	✕
20. Waterborne diseases	√	√	√
21. Population Growth Rate	... [1]1861	...	...
22. Number of Environmental Complaints	... [1]1994	...	...
23. Penalties	... [1]2001	... [1]2001	...
24. Number of offences against Forest Laws	√ [1]1999	≈	≈
25. Human Development Index	√	√	√
26. Gini Coefficient	✕	✕	✕
27. Adult Literacy Rate	√	√	√
28. Total Length of Road	√	√	√
29. Number of Internet Subscribers	√ [1]1999	√	√
30. Total Public Transportation Journeys	≈	≈	≈

[1] *Year as shown if not 1990 and 2000*
[2] *Direction of change in latest year is provided to give an indication only and may not represent a clear improvement or deterioration.*

Presentation of the indicators

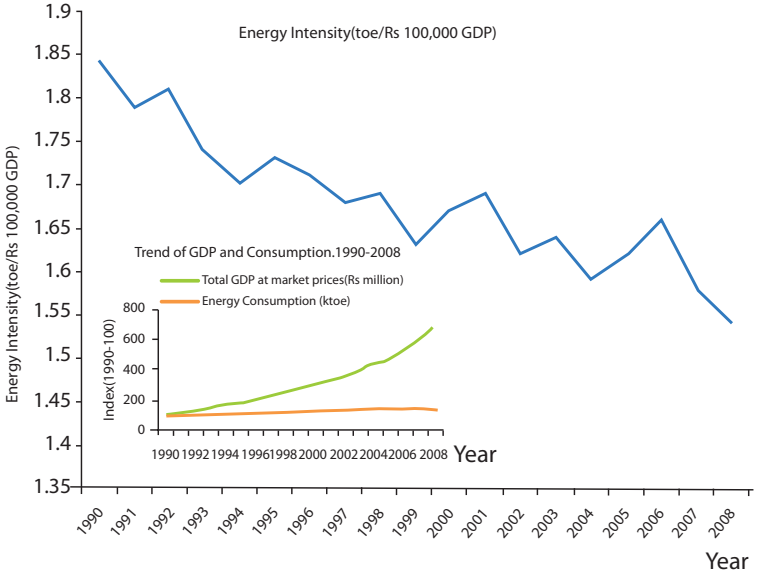
For each indicator, one chart is provided that shows the data from 1990, or the earliest available year after 1990 (Except for the chart on population growth rate, where date is available between 1861 and 2000).

In some cases the indicator measures have been shown as an index, which means that the value of the measure for a base year is treated as representing 100 (per cent). Subsequent or preceding values of the measure are then shown in relation to that base value- in effect as a percentage of it. This allows trends in measures with different units to be more easily comparable.

The traffic light assessments have been shown beneath the charts.

Efficiency – Based SCP Indicators

1.Energy Intensity



Since 1990 √ **Since 2000** √ **Direction in latest year** √

Energy intensity is a measure of the efficiency with which energy is being used in a nation's economy. It is calculated as the total units of energy consumption per unit of Gross Domestic Product (GDP). As the energy intensity decreases, it means that less energy is consumed to produce the same unit of economic growth, hence the economy is more energy efficient.

1.Energy Intensity (contd)

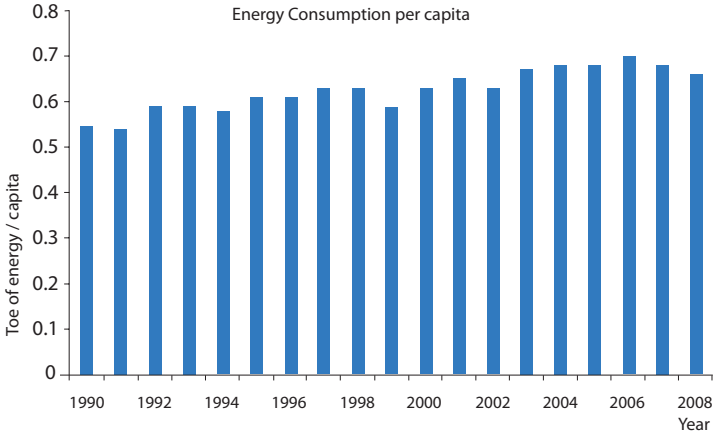
High energy intensity indicates a high price or cost of converting energy into GDP.

Low energy intensity indicates a lower price or cost of converting energy into GDP.

From 1990 to 2008, though, the rise in economic growth has brought about higher energy consumption, there has been a decrease in energy intensity from 1.84 to 1.54 toe /Rs 100 000 GDP. This indicates that there has been an increasing decoupling of energy consumption from economic growth.

With programmes for increasing energy conservation and efficiency as well as expanding renewable energy in Mauritius, it is expected that the energy intensity should further reduce.

2.Energy Consumption per Capita



Since 1990 ✗ **Since 2000** ✗ **Direction in latest year** √

The annual energy consumption per capita has increased from 0.55 toe in 1990 to 0.66 toe in 2008. From 1990, the transport sector has remained the largest consumer of energy followed by the manufacturing sector. In 2008, the transport and manufacturing sectors accounted for 48.3% and 29.4% of the total energy consumption respectively. Household consumption accounted for 13.1% of the total energy consumption and agriculture 0.5%.

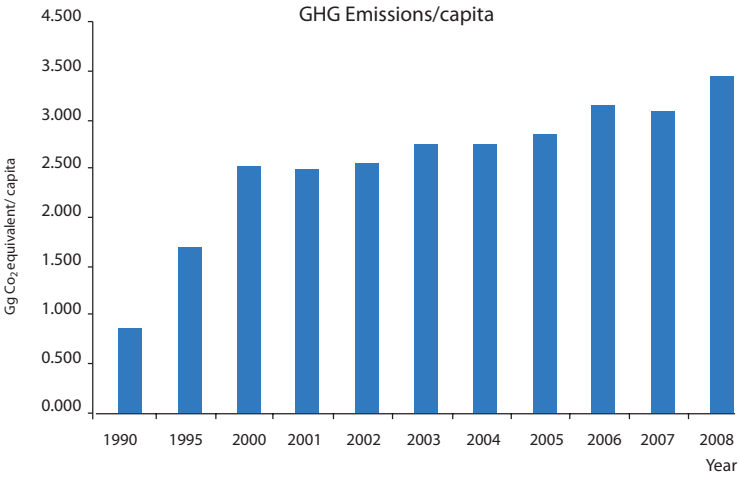
The rise in energy consumption per capita from 1990 to 2008 is inevitably linked to the rise in the number of vehicles on our roads, the growth of the industrial and electronics sector and

2.Energy Consumption per Capita (contd)

the rise in standards of living. Rapid technological progress has resulted in a multitude of new electronic products available in the market. Furthermore, rising incomes and falling prices of electronic products have ensured that more people are able to afford electronics, hence resulting in an increased use of household electrical appliances like microwaves, air conditioners, washing machines, refrigerators, freezers, etc.

However, a decrease in energy consumption per capita has been observed from 2006. In 2006, the energy consumption per capita was 0.70 toe and it decreased to 0.68 toe in 2007 and further to 0.66 toe in 2008. This could be explained by the great momentum created for sustainable energy consumption in Mauritius namely by intensive public awareness on energy saving and the schemes under the Maurice Ile Durable Fund put in place by government such as the national replacement campaign of conventional bulbs by compact fluorescent bulbs in resident dwellings, financial incentives to promote solar water heaters,etc.

3.Greenhouse Gas Emissions per Capita



Since 1990 ✗ **Since 2000** ✗ **Direction in latest year** ✗

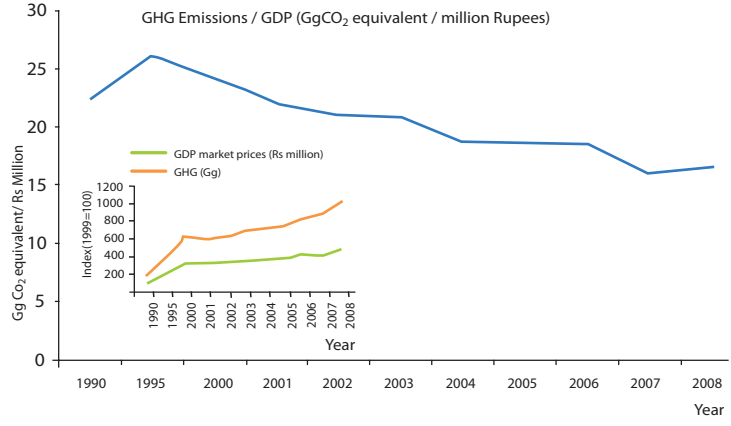
Carbon dioxide equivalent is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). The carbon dioxide equivalent of a gas is derived by multiplying the weight of the gas by its associated GWP. The CO_2 equivalent in the graph above has been computed for 3 GHGs, namely carbon dioxide, methane and nitrous oxide.

A rise in net GHG emissions per capita from 0.861 Gg/ capita

in 1990 to 3.450 Gg/ capita in 2008 was observed, representing an annual increase of 8%.

In Mauritius, the main contributor of GHG emissions is carbon dioxide (CO_2) and it arises mostly from the combustion of fossil fuels for electricity production, manufacturing industries, transport, industrial processes, agriculture and waste management. A rise in net CO_2 emissions from 1517 thousand tonnes in 1995 to 3264 thousand tonnes in 2008 was observed, representing a rise of 115%. Net emissions of CO_2 take into account the removal of CO_2 by forests which act as “sinks”.

4.Greenhouse Gas Emissions per GDP



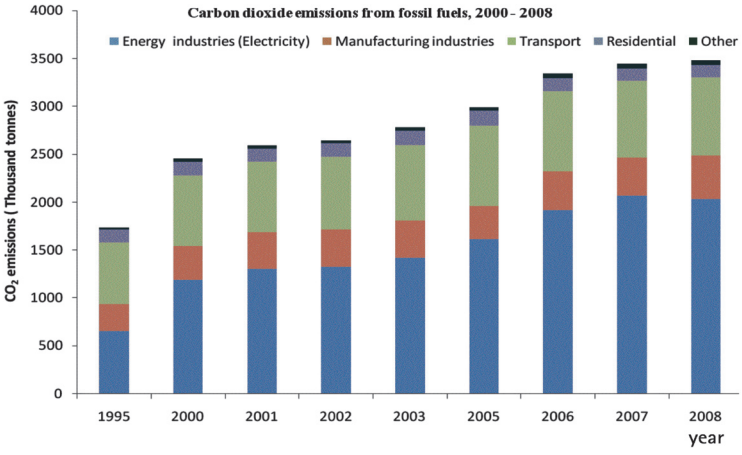
Since 1990 √ **Since 2000** √ **Direction in latest year** √

Despite a net rise in GHG emissions from 1990, there has been a slight decoupling of GHG emissions from economic growth (Refer to embedded graph).

Many public institutions are collaborating with the Ministry of Environment and Sustainable Development to do their environmental reporting in a view to reduce their carbon footprint. Industries and businesses are also becoming more and more aware of Sustainable Consumption and Production and are engaging themselves to invest more on clean production and reduce their carbon footprint.

With the rising prices of fossil fuels, gradual shift to organic farming and projected decrease in landfilled waste, it is believed that the GHG emissions per GDP will further reduce in future.

5. Carbon Dioxide Emissions from fossil fuels by sector



Since 1995 ✗ **Since 2000** ✗ **Direction in latest year** ≈

Carbon dioxide emission resulting from fuel combustion went up from 1,736.9 thousand tonnes in 1995 to 3,485.8 thousand tonnes in 2008, a rise of 100.7% with an annual increase of 5.5%.

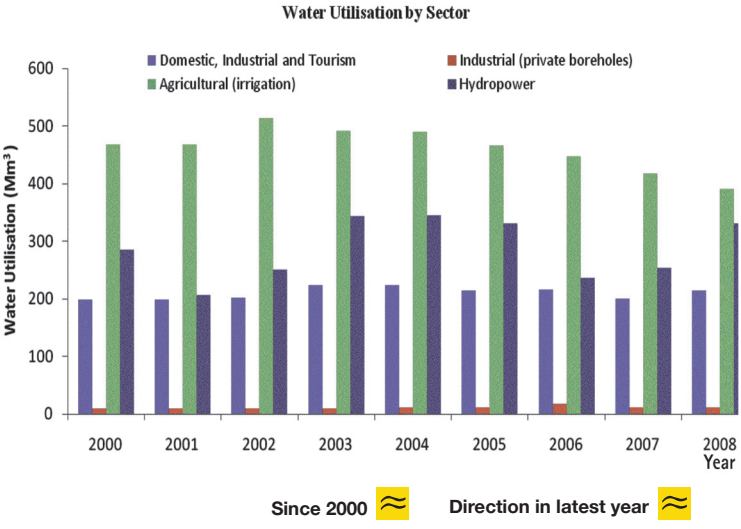
Over the years, the energy industries have remained the principal source of CO_2 emission in the atmosphere. They contributed around 58% of the emissions, with 2,032 thousand tonnes in 2008. They were followed by the transport sector

5. Carbon Dioxide Emissions from fossil fuels by sector (contd)

which contributed around 23% of the total emissions and the manufacturing industries with 13.1%.

From 2007 to 2008, a 1.7% decrease of CO_2 emissions was obtained from energy industries. This could be explained by the rise in total energy production from local renewable sources which rose by 7.3% from 246 ktoe in 2007 to 264 ktoe in 2008. This was primarily due to a higher production of bagasse for electricity production.

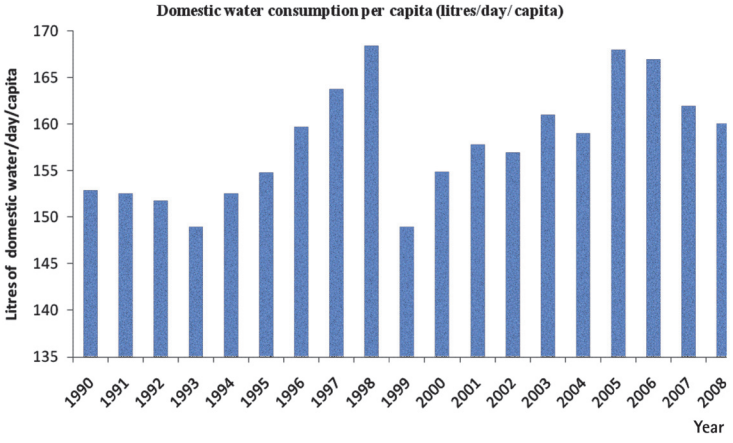
6. Water Utilization by Sector



From 1990 to 2008, the agricultural sector has accounted for most of the water utilized, namely for irrigation. However, for the period, 2002 to 2008 there has been a general decrease in water utilization in the agricultural sector. This can be explained by the introduction of efficient irrigation systems such as drip irrigation as well as the decrease in area of land under sugar cane.

In 2008, the total water demand was estimated at 947 Mm^3. The agricultural sector accounted for 391 Mm^3 or 42%. Utilization for the other purposes was as follows: hydropower 331 Mm^3 or 35%; and domestic, industrial and tourism, 214 Mm^3 or 23 %.

7. Domestic Water Consumption per Capita



Since 1995 ✗ **Since 2000** ✗ **Direction in latest year** ✓

During the period from 1990 to 2008, the domestic per capita consumption of water has risen from 152.9 litres /day to 160.1 litres / day. However, there has been no constant underlying increase in per consumption rates owing to other variables, namely the amount of rainfall, the weather conditions, droughts, leakage losses, etc.

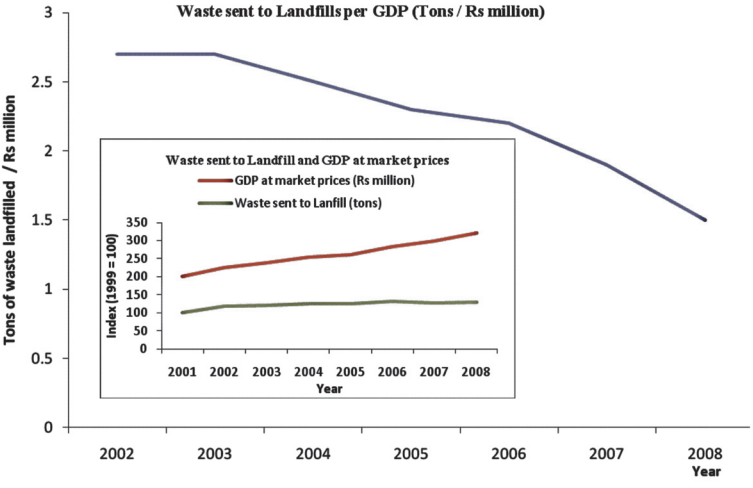
In recent years, a decline in household water consumption was observed from 168 litres /day in 2005 to 160.1 litres/ day in 2008. This could be explained by more water efficient devices,

7. Domestic Water Consumption per Capita (contd)

severe water cuts during the dry seasons as well as national awareness campaigns on water savings.

Total water demand will increase in the future due to additional development. However, with the development of rainwater harvesting systems and the establishment of water efficient plumbing codes and regulations in the coming future, it is expected that the per capita water consumption will further decrease.

8.Waste sent to landfills per GDP



Please note that the amount of waste that were sent to the landfill for the period 1999 to 2001 represents only part of waste collected as open dumping sites were in operation. The last site to be closed was the Richfund Dumping Ground in February 2001

Since 2001 √ **Direction in latest year** √

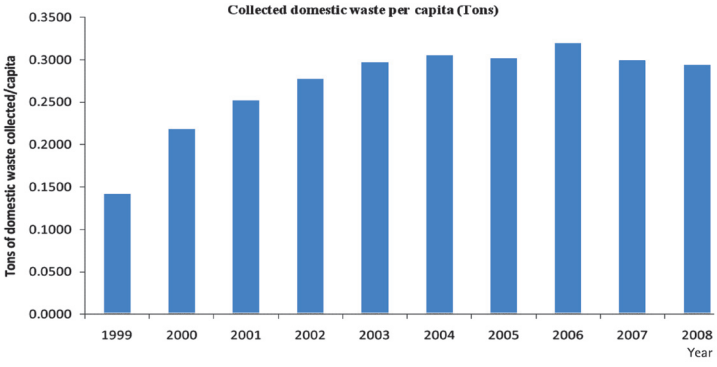
The waste sent to landfills per GDP represents waste generation in relation to economic activity of the country. From 2001 to 2003, an increase in the waste landfilled per GDP was obtained while in recent years, a marginal decline has been obtained.

8.Waste sent to landfills per GDP (contd)

The marginal decline in waste landfilled per GDP indicates a relative decoupling of waste generation from the volume of economy. However, it does not necessary correspond to waste reduction. In fact, the total amount of solid waste landfilled went up from 306,691 tons in 2001 to 399,488 tons in 2008, representing an increase of 30.2 % with an annual increase of 3.8%.

The increasing waste generation and its disposal have remained a major environmental problem for Mauritius.

9.Collected Domestic Waste per Capita



Since 1999 ✗ **Since 2000** ✗ **Direction in latest year** √

The collected domestic waste per capita is a measure of the amount of waste generated by households and is directly related to an individual's production and consumption patterns.

From 1999 to 2003, an increase in the household waste collected per capita was recorded while a slight decrease has been noted since 2006.

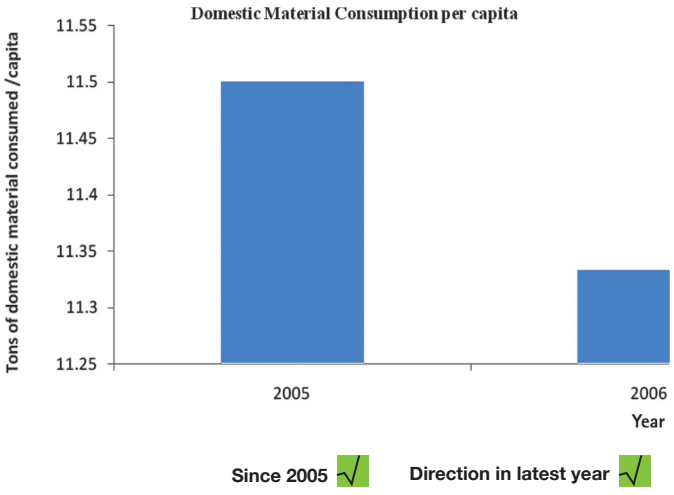
With rising incomes and quality of life, an increase in the amount of household waste is expected. The slight decrease in recent years indicates a marginal decoupling of waste generated from

9.Collected Domestic Waste per Capita (contd)

rising incomes. There could be various reasons for this situation , namely:-

- increased household composting
- initiatives by NGOs and other environment partners for sorting and recycling of materials such as paper , PET bottles, scrap metals, textile waste, carton, cans and glass , batteries and mobiles
- regular collection of bulky waste by local authorities
- the rise in price of many household goods and products

10. Domestic Material Consumption (DMC) per Capita



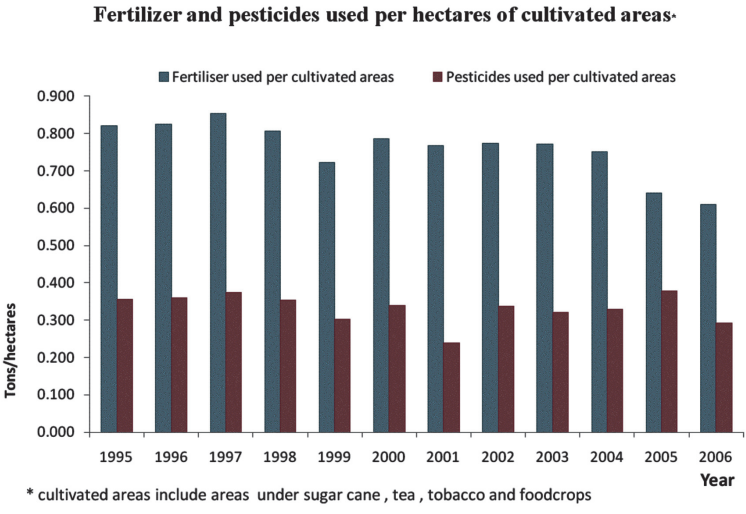
Since 2005 √ **Direction in latest year** √

Domestic Material Consumption (DMC) accounts for all materials directly consumed by the economy in a country and is defined as all materials entering directly the national economy (used domestic extraction plus imports), less the materials that are exported. In economic terms, it is related to the consumption activities of the residents of a national economy. In environmental terms, DMC is a proxy for potential environmental pressures on the domestic environment. It is considered as a good indicator for measuring the decoupling of economic growth and the use of natural resources.

10. Domestic Material Consumption (DMC) per Capita (contd)

From 2005 to 2006, there has been a slight decrease in DMC from 11.5 to 11.3. A positive trend towards decoupling of economic growth from the use of resources was therefore observed.

11.Consumption of fertilizers and pesticides



Since 1995 √ **Since 2000** √ **Direction in latest year** √

Intensive use of chemical based fertilizers and other agro-chemicals may contribute to the pollution of the environment through the leaching of nitrate to ground water.

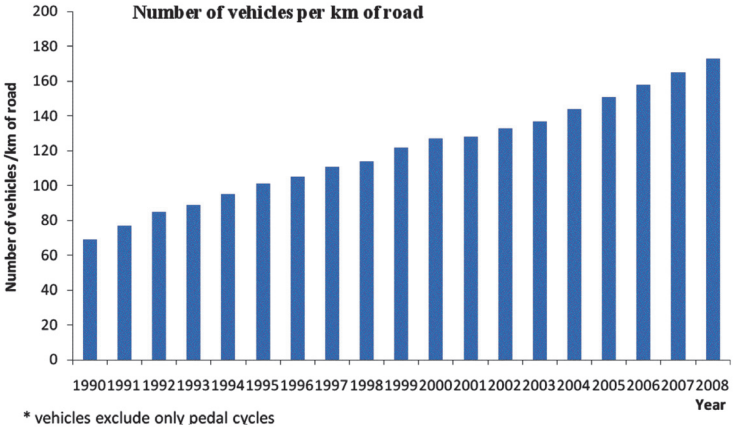
A slight decline in the total amount of fertilizers and pesticides consumed has been noted from 2004. This could be explained

11. Consumption of fertilizers and pesticides (contd)

by the rise in prices of agro-chemicals, decrease in land under cultivation as well as extensive sensitization of farmers on sustainable agriculture practices.

With the growing interest of farmers and consumers in organic farming coupled with market exigencies, there may be a further decline in the consumption of fertilizers and pesticides in the future.

12. Number of vehicles per km of road



* vehicles exclude only pedal cycles

Since 1990 ✗ **Since 2000** ✗ **Direction in latest year** ✗

Industrialization, continuous economic growth and higher standard of living have led to a rapid increase in transport services over the recent years. A number of environmental problems is associated with transport, especially emission of carbon dioxide and other pollutants such as nitrogen oxide, volatile organic compounds, sulphur dioxide and particulate.

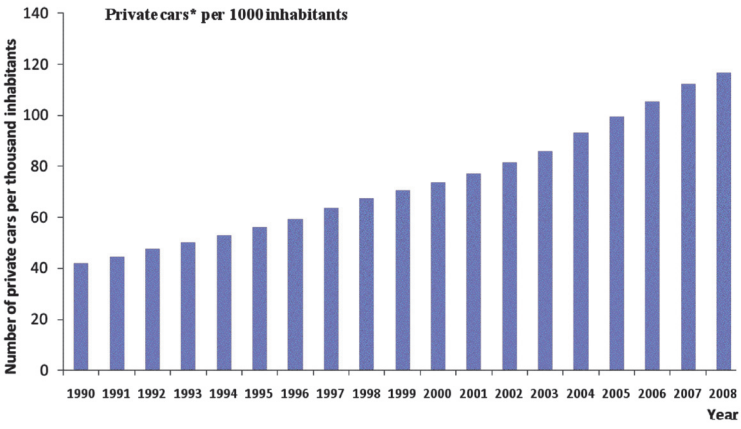
The vehicular fleet has been growing at an average annual rate of around 5.97%. From 1990 to 2008, the total number of

12. Number of vehicles per km of road (contd)

vehicles has gone up from 123,545 to 351,406 in 2008, a rise of 184.4% with an annual increase of 5.97%.

Traffic congestion is a serious problem and the total cost to the economy of congestion is estimated to be around 1.3% of GDP. The density of vehicles has been considerably increasing and reached 173 vehicles per km of road in 2008 from 69 vehicles per km of road in 1990. This expansion in the number of vehicles has also been accompanied by a corresponding growth in energy consumption and carbon dioxide emission in the transport sector.

13. Private cars per 1000 inhabitants



*Private cars include dual purpose vehicle and excludes taxi car

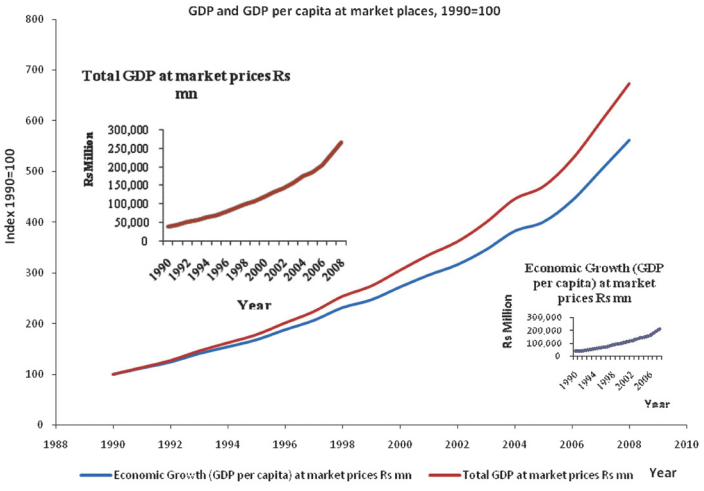
Since 1990 ✗ **Since 2000** ✗ **Direction in latest year** ✗

The number of private cars per 1000 population rose from 42 in 1990 to 117 in 2008, representing an increase of 178.6 % with an annual rate 5.9%. About 42.3% of the vehicular fleet is private cars.

The rapid increase in number of private cars indicates a rapid rise in household income and could be controlled through the provision of a more efficient public transportation in Mauritius.


Critical stock
SCP Indicators

14. Economic Growth



Since 1990 ... **Since 2000** ... **Direction in latest year** ...

The Gross Domestic Product (GDP) is the most accepted indicator of economic growth of a country. It is calculated on the basis of the aggregate money of goods and services produced within a country out of economic activity during a specific period, usually a year. From 1990 to 2008, GDP in real terms grew on average by 4.6% per annum.

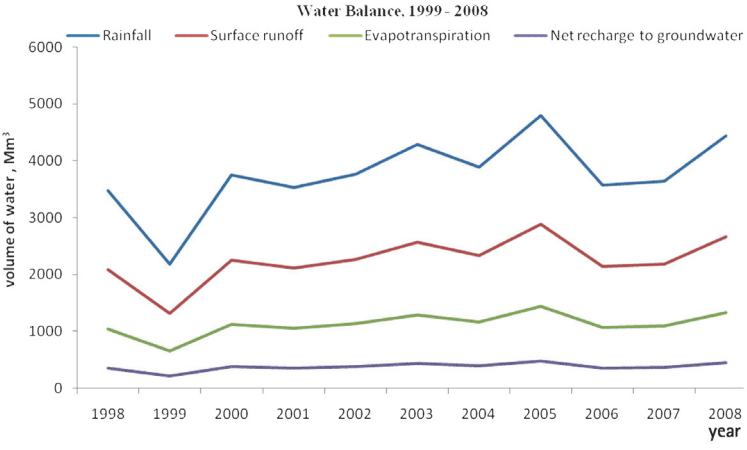
The GDP per capita at market prices is used as an indicator of the standard of living of the population. With an annual growth of 1.0 % in the population and 4.6% in GDP at market prices,

14. Economic Growth (contd)

GDP per capita grew by 10.1% per annum during the period 1990 to 2008.

From 1998 to 2008, while comparing the structure of the economy, a gradual shift from agriculture to the service sectors is observed. The share of the agricultural, hunting, forestry and fishing sector in Gross Domestic Product (GDP) which was 9.3% in 1998 went down to 4.4% in 2008. The manufacturing sector also experienced a fall, from 24.0% in 1998 to 20.1% in 2008. On the other hand, “Hotels and restaurants”, a major component of the Tourism sector, witnessed a rise from 6.2% to 8.6% during the same period. The share of “Real estate, renting and business activities” which was 8.7% in 1998 increased to 11.5% in 2008.

15. Water Balance



Since 1998 ••• **Since 2000** ••• **Direction in latest year** •••

Freshwater resources are of vital environmental and biological importance, since water is a basic support element for human life and ecosystems. The water balance is based on long term records of annual average rainfall and indicates how fresh water resources are distributed.

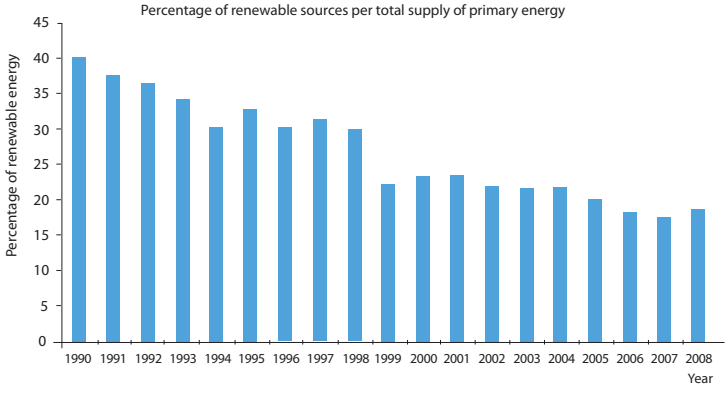
From 1999, there has been a slight increase in precipitation, though there has been a severe drought in 1999. In 2008, the

15. Water Balance (contd)

island of Mauritius received 4,440 million cubic metres (Mm^3) of precipitation (rainfall). This was 22.0% higher than in 2007 when 3,644 Mm^3 were obtained. Surface runoff accounted for 60% of the water balance, while evapo-transpiration and ground water recharge accounted for 30% and 10% respectively.

However, it should be highlighted that long-term time series of rainfall amount from 1950s to 2008 show a decreasing trend in annual rainfall for Mauritius. In fact, with impacts of climate change, it is projected to have a decreasing rainfall trend in Mauritius with a rise in the number of heavy precipitation events.

16.Percentage of renewable sources per total supply of primary energy



Since 1998 ✗ **Since 2000** ✗ **Direction in latest year** ✓

Mauritius is heavily dependent on fossil fuels for its energy needs. In 2008, 81.2% (1,140 ktoe) of the total primary energy requirement was met by imported fuels (fuel, Liquefied Petroleum Gas, coal) and the remaining 18.8% obtained from local renewable sources (bagasse (93.2%), hydro electricity (3.5%), fuelwood (2.9%) and wind energy (0.4%)).

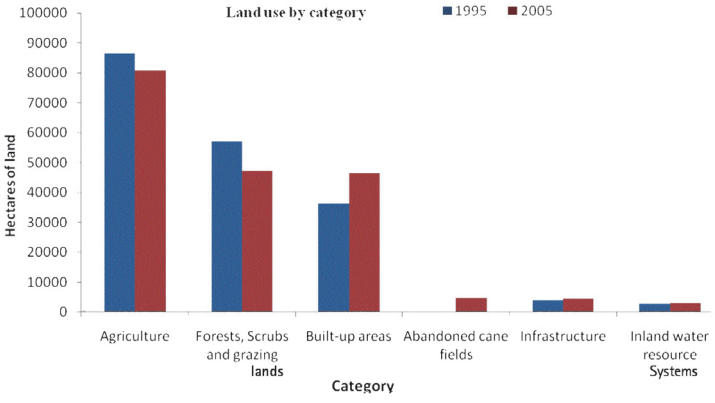
An overall decline in the share of renewable sources per total energy requirement was observed over the years from 1990. However, total energy production from local renewable sources

16.Percentage of renewable sources per total supply of primary energy (contd)

rose by 7.3% from 246 ktoe in 2007 to 264 ktoe in 2008. This was primarily due to a higher production of bagasse. Thus generation from bagasse increased from 230 ktoe to 246 ktoe. Moreover, production of hydroelectricity increased from 7.2 ktoe to 9.3 ktoe.

With the implementation of programmes for expanding renewable energy, the government's target is to reach about 35% share of renewables in electicity mix by 2025.

17. Land Use by Category



Since 1998 ... **Since 2000** ... **Direction in latest year** ...

Land use changes reflect the competing demand on limited land for economic development in different sectors.

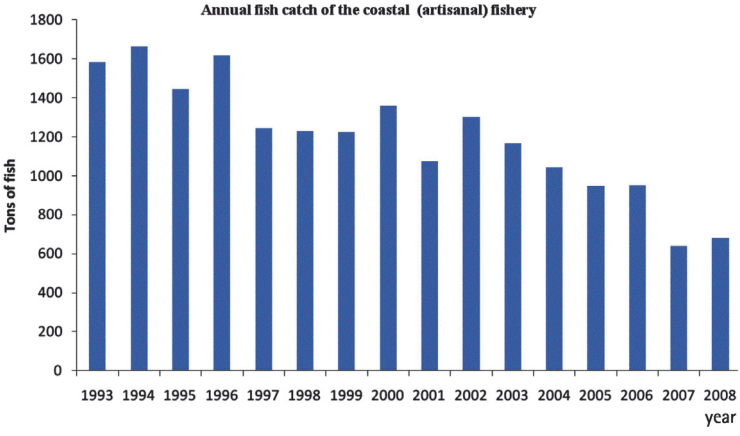
Over the years, urbanization and the development of industries and infrastructure have led to a loss of agricultural land.

From 1995 to 2005, the proportion of land under sugarcane decreased by 6.3%, tea plantations by 81.6% and forestry by 17.2%. Land used for other agricultural activities increased by 33% and built up areas expanded by 27.7%.

17. Land Use by Category (contd)

In 2005, the built- up areas were estimated to cover 25% of the land in Mauritius and this percentage is increasing every year. Agriculture covered 43%, infrastructure 2%, forests 25%, inland water resource systems 2% and abandoned cane fields 3%.

18. Annual Fish Catch of the coastal (artisanal) fishery



Since 1998 ... **Since 2000** ... **Direction in latest year** ...

There has been a decline of about 56.9% in annual fish catch from 1582.6 tonnes in 1993 to 682 tonnes in 2008, representing an annual decrease of 5.45%. Gear – type fishing includes fishing by basket trap, line, large nets, gill nets, cast nets, harpoons and on foot.

In 2008, basket trap accounted for 40% of the total catch,

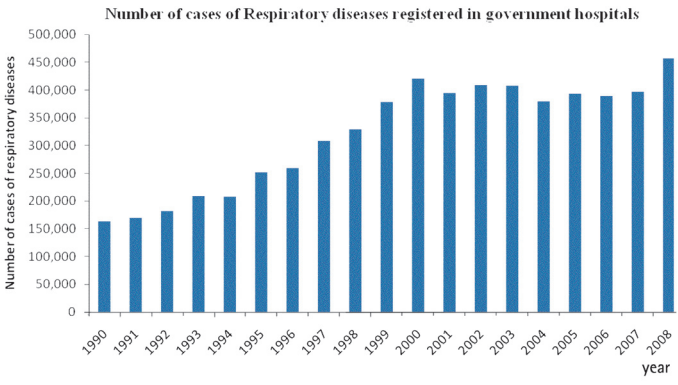
18. Annual Fish Catch of the coastal (artisanal) fishery (contd)

followed by line (26 %) and large net (21%).

The controls on fishing methods have included banning the use of small –mesh sardine nets as well as the use of dynamites. A closed season for net fishing has also been reintroduced.

Coastal waters have faced a loss in productivity mostly due to a reduction in fishing effort.

19. Respiratory diseases



Since 1990 ✗ **Since 2000** ✗ **Direction in latest year** ✗

Respiratory diseases could be a good proxy indicator for air quality. Over the years, it has been noted that the number of cases registered in government general hospitals has kept on increasing with 163,487 cases of respiratory diseases registered in 1990 and 457, 558 cases reported in 2008 with an annual increase of 5.82%.

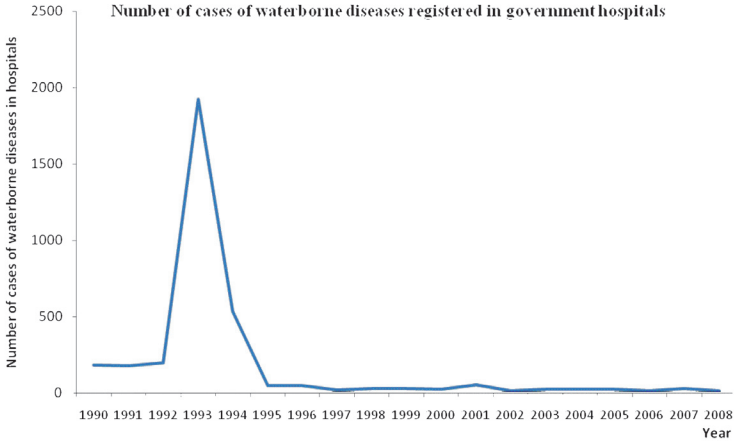
The Ministry of Environment and Sustainable Development has both stationary and mobile air quality monitoring stations that are operational since 2001. The main pollutants under investigation are dust and black carbon. The levels of ambient

pollutants have been well below the norms (Standards for Air 1998) and the overall quality of ambient air can be described as being at a good and permissible level in Mauritius. The increase in respiratory diseases does not therefore seem to directly reflect air quality and its impacts on human health.

In Mauritius, no comprehensive human-health risk studies have been conducted to determine the risks associated with exposure to air pollution sources. Only a few case to case studies have been carried out. For example, a health survey on respiratory problems was carried out in 2002 in the Vacoas-Phoenix Industrial Estate. The survey indicated that population situated downwind from the industrial estate had a higher prevalence of respiratory problems as compared to less exposed populations.

It is opined that significant changes in the weather conditions of Mauritius, namely rise of temperature and humidity, could have a correlation with the rise in respiratory diseases. However, no scientific analysis has been effected locally on the specific correlation between the various climatic conditions and the corresponding respiratory diseases over a defined period of time.

20. Water borne diseases



Note: Data for waterborne diseases have been computed for amoebiasis, infective hepatitis, leptospirosis, typhoid fever. The data pertains for both Mauritius and Rodrigues

Since 1990 √ **Since 2000** √ **Direction in latest year** √

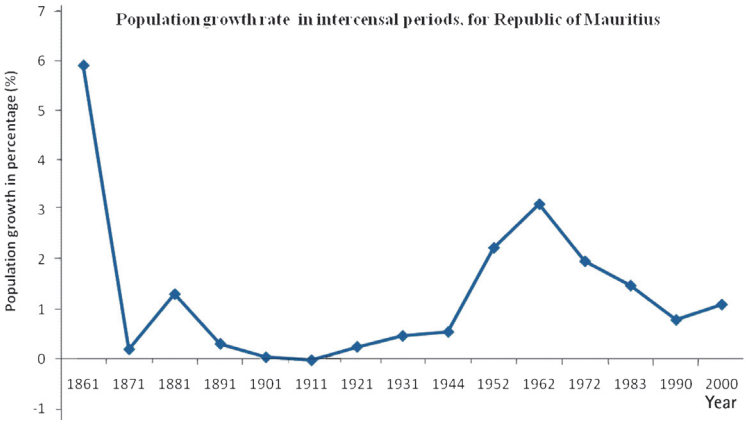
Water borne diseases are caused by organisms that are excreted in large numbers by infected persons and the route of infection is by oral ingestion. Such diseases spread through contaminated water supplies (cholera, typhoid, bacterial or amoebic dissentry, infective hepatitis). It is a known fact that where proper sanitation facilities are lacking, water-borne diseases can spread rapidly. The extent to which these disease

20. Water borne diseases (contd)

organisms occur in specific water resources depends on the amount of human and animal excreta that they contain.

There has been considerable decrease in water-borne, water – related and water- vector diseases over the past years owing to a significant improvement in basic sanitation in Mauritius, and better water and wastewater management strategies. Today , onsite wastewater disposal systems such as septic tanks and absorption systems are being widely used and also more houses are being connected to sewerage systems which are connected to wastewater treatments plants with a view to prevent contamination of our water resources and consequently to reduce water borne diseases.

21. Population Growth Rate



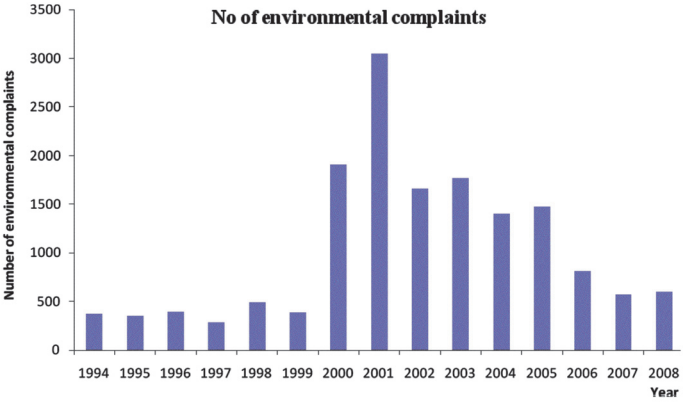
Since 1861 ... **Since 2000** ... **Direction in latest year** ...

From 1861 to 2000, there has been an overall decrease in the population growth rate from 5.91 to 1.1.

Though the population growth rate is not significant, Mauritius is one of the most densely populated islands in the world with a population density of 644 persons per km^2.

Compliance SCP Indicators

22. Number of Environmental Complaints



Since 1994 ... **Since 2000** ... **Direction in latest year** ...

Yearly changing pattern of public complaints registered on environmental issues reflects the state of the environment and the level of public awareness. No. of yearly complaints are registered every year for different environmental concerns (air pollution, water, odour , noise , solid waste, etc.)

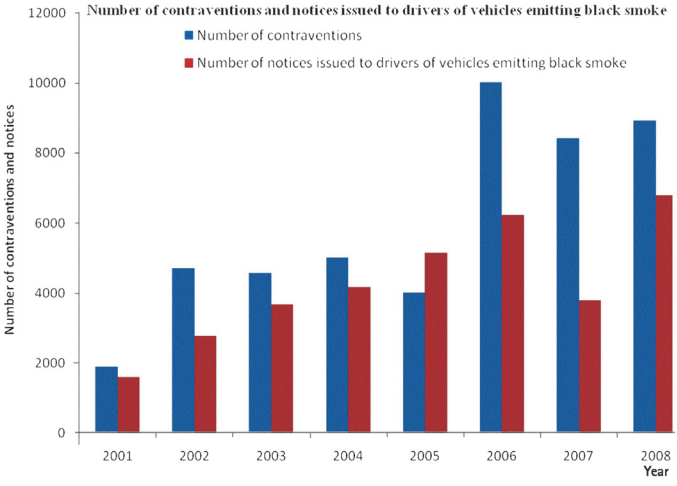
The number of environmental complaints increased drastically from 370 in year 1994 to 1906 in year 2000. In December 2000, Police de L'Environnement was created for the protection of the environment. The police officers have the mission to attend to public environmental complaints and establish contraventions.

22. Number of Environmental Complaints (contd)

The highest number of environmental complaints was registered in 2001 with 3051 complaints. However, from 2002 onwards, there has been a declining trend in the number of environmental complaints to reach 596 in 2008.

There is no clear- cut reason why the number of environmental complaints has declined since 2002. However, this decline could most probably be due to the rise in the number of environmental standards, guidelines and regulations under the Environment Protection Act 2002 and with the rise in fixed penalties. Furthermore, environmental responsibility is being integrated at all levels and the public is becoming more and more environment conscious. Enforcing agencies have also been empowered to enforce their respective environmental laws such that all relevant stakeholders are taking active part in environmental protection.

23. Penalties

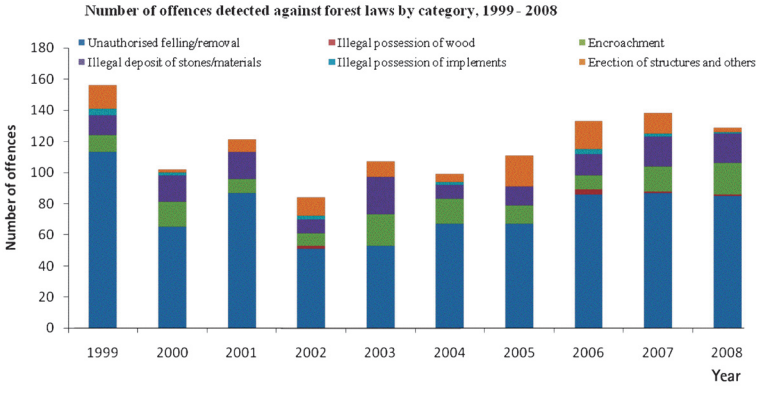


Since 2001 ... **Direction in latest year** ...

The number of contraventions issued by Police de L'Environnement has increased from 1886 contraventions in 2001 to 8922 contraventions in 2008. In 2008, the Police de L'Environnement issued 8,922 contraventions of which illegal littering accounted for 92%.

During the period from 2001 to 2008, there was a general increase in the number of notices issued to drivers of vehicles emitting black smoke from 1,592 to 6,782.

24. Number of offences against forest laws



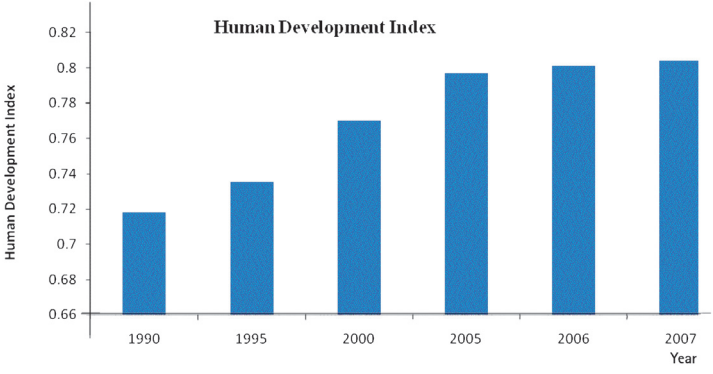
Since 1999 √ **Since 2000** ≈ **Direction in latest year** ≈

There has been a marginal decrease in the number of offences against forest laws from 156 in 1999 to 129 in 2008.

The forest laws comprise mainly the Forests and Reserves Act 1983 , Rivers and Canals Act 1863, and Environment Protection Act 2002.

Connectivity SCP Indicators

25. Human Development Index



Since 1999 √ **Since 2000** √ **Direction in latest year** √

The Human Development Index (HDI) is a comparative measure of life expectancy, literacy, education and standards of living for countries worldwide. It is computed by the UN and measures the average achievements of a country in three basic dimensions of human development namely:-

- A long and healthy life, as measured by life expectancy at birth.
- Knowledge, as measured by the adult literacy rate and the combined primary, secondary and tertiary enrolment ratio.
- A decent standard of living, as measured by GDP per capita

25. Human Development Index (contd)

The index ranges between 0 (lowest level of human development) and 1 (highest level of human development).

There has been an increase in the human development index from 0.718 in 1990 to 0.804 in 2007. As per United Nations Development Program's Human Development Report 2009, Mauritius is ranked 81st on the world map with high human development and is classified as a developing country.

26. Gini Coefficient

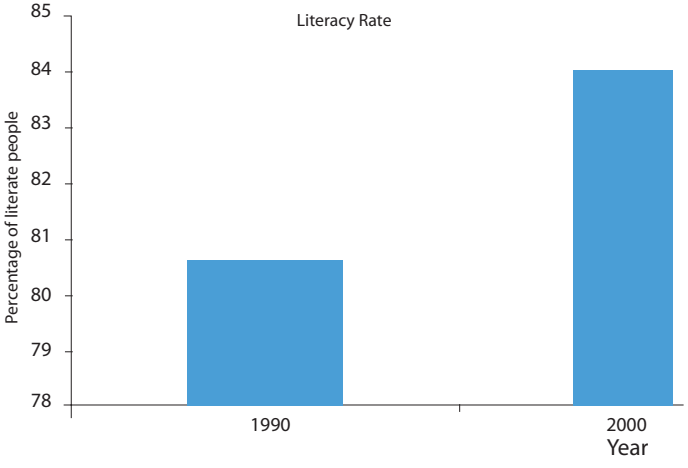
Since 1990 ✗ **Since 2000** ✗ **Direction in latest year** ✗

The Gini Coefficient measures the degree of inequality in the income distribution of households. It varies between 0 for complete equality and 1 for complete inequality.

Though there have been minor fluctuations in the Gini Coefficient since 1990, it can be said that the Gini coefficient has remained relatively low. In 1990/1991, the Gini coefficient was 0.379, 0.387 in 1996/1997, 0.371 in 2001/2002 and 0.388 in 2006/2007.

The Gini coefficient of the entire world is between 0.56 and 0.66 while that of Europe is about 0.31.

27. Adult Literacy Rate

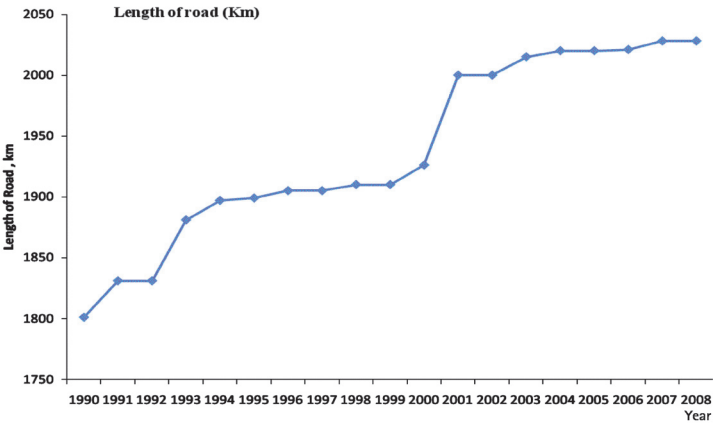


Since 1990 √ **Since 2000** √ **Direction in latest year** √

Adult literacy rate reflects the stock of literate persons within adult population, i.e. who can read and write. The level of literacy in society is critical for promoting and communicating sustainable lifestyles and improving the capacity of people to address unsustainable consumption and production patterns.

In 1990, the literacy rate was 80.6% while in 2000, it was about 84%. As per the United Nations Development Programme Report 2009, Mauritius is ranked 109th on adult literacy rates.

28. Total Length of Road

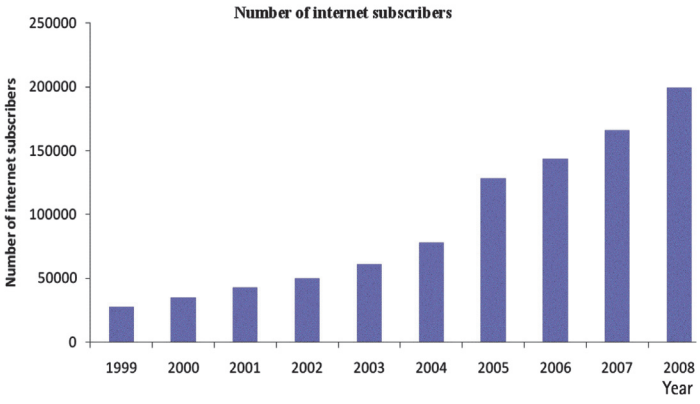


Since 1990 √ **Since 2000** √ **Direction in latest year** √

The total road length in Mauritius has gone up from 1801 km in 1990 to 2028 km in 2008. Increase in the road networks bring about greater connectivity to facilities as well as public transportation, hence more sustainable mobility. People do not need to travel over long distances to get access to services like hospitals, schools, supermarkets and other facilities.

It is envisaged to further widen the road networks in a near future. A number of eco-friendly road projects with provision for pavements and bicycle tracks are in pipeline.

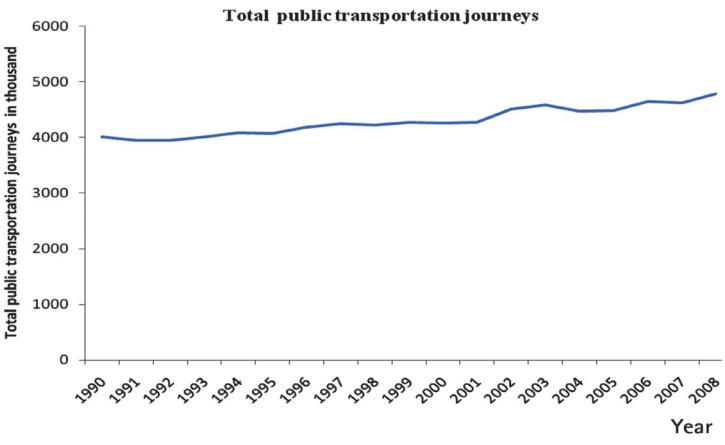
29. Number of internet subscribers



Since 1999 √ **Since 2000** √ **Direction in latest year** √

There has been a drastic increase in internet subscribers from 27,500 in 1999 to 199,511 in 2008. This indicates greater access to information and communication technologies, hence a more environment conscious society.

30. Total public transportation journeys (Number of trips)



Since 1999 ≈ **Since 2000** ≈ **Direction in latest year** ≈

The total public transportation journeys provide an idea of access to public transport and its usage in the country.

It was observed that the number of public transportation trips has increased only marginally from 1990 to 2008 and therefore the percentage of people using public transportation networks has not increased significantly. On the other hand, the number of private vehicles has increased rapidly in the past 10 years.

30. Total public transportation journeys (Number of trips) (contd)

The poor usage of public transportation could be justified by the inefficient public transportation system (bus transportation) in Mauritius. Much needs to be done in order to improve the mass transportation systems in Mauritius and help us move towards a sustainably mobile society.

Contact Address

Director of Environment
Ministry of Environment and Sustainable Development
Ken Lee Tower, Line Barracks Street
Port- Louis,
Mauritius
Tel: (230)2036200 -10 / 211 3198
Fax: (230) 2106687
Email: menv@mail.gov.mu
Website: http://environment.gov.mu

This pocketbook on SCP Indicators is opened for comments and suggestions. Any further improvements could be considered in future issues.

An electronic version of this publication can be downloaded from the Ministry's website: http://environment.gov.mu.